

### CLAIMS

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

- 1           1.     A method for improving throughput in continuous electrodialysis pro-  
2     cesses, the method comprising automatically controlling the pH of acid loop solutions  
3     in strong acid/weak base configurations and of base-loop solutions in weak acid/strong  
4     base configurations.
- 1           2.     The method as recited in claim 1 wherein the process involves the  
2     formation of an acidic solution in an electrodialysis stack and a buffer is added to the  
3     solution.
- 1           3.     The method as recited in claim 1 wherein the process involves the  
2     formation of a basic solution and a buffer is added to the solution.
- 1           4.     The method as recited in claim 1 wherein a buffer is added to the solution  
2     and is regenerated continuously and external to the stack.

1           5.     The method as recited in claim 4 wherein the buffering agent is premixed  
2 with a solution situated remotely from the stack.

1           6.     The method as recited in claim 1 wherein a buffering agent is added at  
2 ambient temperature.

1           7.     The method as recited in claim 1 wherein the electrodialysis process  
2 operates at a temperature which ranges from about 15°C to 40°C.

1           8.     The method as recited in claim 4 wherein the concentrations of the  
2 anionic and cationic moieties of the buffer are dependent upon the desired pH.

1           9.     The method as recited in claim 8 wherein the anionic and cationic  
2 moieties are added to the ED system as solids, liquids, gases, solutions or any combi-  
3 nation thereof.

1           10.    The method as recited in claim 1 wherein for an electrodialysis solution  
2 that will become acidic, a buffer pair is created by adding an acid and a metal hydroxide  
3 to the "acid-loop" stream.

1           11.    The method as recited in claim 1 wherein for an electrodialysis solution  
2 that is already acidic, a buffer pair is created by adding a metal salt of the acid's  
3 conjugate base to the "acid-loop" stream.

1           12.    The method as recited in claim 1 wherein for an electrodialysis solution  
2 that will become basic, a buffer pair is created by the addition of a base and its conju-  
3 gate acid to the "base-loop" stream.

1           13.    The method as recited in claim 1 wherein for an electrodialysis solution  
2   that is already basic, a buffer pair is created by the addition of an acid to the "base-  
3   loop" stream that contains, as its conjugate base, the base present in the ED electrolyte  
4   solution.

1           14.    A process for maintaining the condition of electrodialysis membranes in    /  
2   electrodialysis cell compartments, the process comprising controlling the pH in an acid-  
3   loop or base-loop solution created by the electrodialysis cell in operation within two pH  
4   units.

1           15.    The process as recited in claim 14 wherein a buffer solution is a means of  
2   maintaining the pH of the ED acid solution at a desired level.

1           16.    The method as recited in claim 15 wherein the buffer solution is supplied to  
2   the cell compartments via a tank external to the cell compartments.

1           17.    The method as recited in claim 14 wherein controlling the pH in the acid-  
2   loop is a means of protecting bipolar membranes and their active sites.

1           18.    The process as recited in claim 15 wherein the buffering solution is added  
2   at ambient temperature.

1           19.    The method as recited in claim 14 wherein the electrodialysis cell  
2   operates at a temperature which ranges from about 15°C to 40°C.

1           20.    The method as recited in claim 14 wherein a buffer solution is added to  
2   maintain the pH of solutions to within 2 pH units of a desired pH.